

REMARKS

Applicants have amended their claims in order to further clarify the definition of various aspects of the present invention. Specifically, Applicants have amended claim 1 to further define the episulfide compound containing a thirane ring, by incorporating into claim 1 the subject matter of previously considered claim 5. In light of amendments to claim 1, claims 4 and 5 have been cancelled without prejudice or disclaimer, and dependency of claim 6 has been amended.

Applicants have added new claim 30 to the application. Claim 30, dependent on claim 6, recites that n is 0.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the references applied by the Examiner in rejecting claims in the Office Action mailed April 27, 2009, that is, the teachings of U.S. patent documents to Amagai, et al., Patent No. 5,807,975, to Hojo, et al., Patent Application Publication No. 2003/0129385, to Sakane, et al., Patent No. 4,975,922, to Gobran, et al., Patent No. 3,624,055, and to Haniu, et al., Patent Application Publication No. 2002/0179241, and the article by Tachi, et al., "Photochemical Reactions of Quaternary Ammonium Dithiocarbamates as Photobase Generators and Their Use in the Photoinitiated Thermal Crosslinking of Poly(glycidyl methacrylate)", in J. Polymer Science Part A, Vol. 39 (2001), pages 1329-41, under the provisions of 35 USC 102 and 35 USC 103.

It is respectfully submitted that the references as applied by the Examiner would have neither disclosed nor would have suggested such coating composition as in the present claims, having, the photocurable composition including (A) the episulfide

compound containing a thiirane ring, which compound is represented by the general formula (4) in claim 1, (B) a photo-base generator represented by the general formula (1) in claim 1, with (-A⁺) being an ammonium ion selected from the group consisting of those represented by the structural formulae (2) set forth in claim 1, and (C) a modified silicone oil, the modified silicone oil being included in the coating composition in an amount of 0.005 to 4 parts by weight based on 100 parts by weight of the episulfide compound containing the thiirane ring. See claim 1.

As will be set forth in more detail infra, it is respectfully submitted that by including the modified silicone oil, in an amount as in the present claims, in the coating composition, wetting property of the coating composition is adequate, while transparency of the coating film is achieved. The evidence in Examples 14-17 of Applicants' original disclosure, as compared with Comparative Examples 6-8 thereof, on pages 31-33 of Applicants' specification, shows unexpectedly better results achieved by the present invention in improved wetting property while achieving good transparency, for composition including modified silicone oil in amounts as in the present claims, as compared with coating compositions either containing no modified silicone oil or containing amounts thereof outside the scope of the present claims. It is respectfully submitted that this evidence of unexpectedly better results in Applicants' specification must be considered in determining patentability. See In re DeBlauwe, 222 USPQ 191 (CAFC 1984).

At various locations in the Office Action mailed April 27, 2009 (for example, in the second full paragraph on page 12, the first full paragraph on page 13, the first full paragraph on page 14, and the second full paragraph on page 17 thereof), the

Examiner contends that various examples and comparative examples use bis(β-epithiopropyl) sulfide as the episulfide compound containing a thiirane ring, but that claim 1 recites "an episulfide compound with a thiirane ring" which encompasses a large number of compounds.

However, attention is respectfully directed to claim 1 as presently amended, reciting that the episulfide compound is represented by the general formula (4), wherein m is an integer of 0-4 and n is an integer of 0-2. Moreover, note claim 30, setting forth the compound used in the Examples. It is respectfully submitted that in the compounds represented by the general formula (4), 2 "β-epithio groups" (thiirane rings) alone take part in curing reactions by the photo-base generator. Even in a case where m is 0-4 and n is 1 or 2, the compound represented by the general formula (4) has 2 β-epithio groups alone as a group taking part in the curing reaction, and it is respectfully submitted that a person skilled in the art would have understood that the $-[-\text{CH}_2]_n-\text{S}-]$ _n unit in the general formula (4) would show no curability. Note that the bis(β-epithiopropyl) sulfide used in the examples corresponds with a compound represented by the general formula (4) wherein n is 0; see claim 30. Thus, it is respectfully submitted that the episulfide compound containing a thiirane ring as in claim 1 is commensurate in scope with the evidence of record. In this regard, it is respectfully submitted that Applicants need not test each and every compound within the scope of their claims; and that the evidence of record, together with the foregoing reasoning as to the active groups taking part in the curing reaction, establishes unexpectedly better results for the full scope of the present claims with respect to the episulfide compound (A).

Moreover, note that the present invention is directed to a coating composition including a photocurable composition, more particularly, the photocurable composition has the property that it is cured by irradiation with light (see claim 28), in particular, has the property that it is cured by irradiation with ultraviolet light (see claim 29). As will be discussed in more detail in the following, the applied primary reference to Amagai, et al. provides no mention of photocuring; and, more specifically, discloses, for example, in column 12, lines 54 and 55, a polymerizing/curing reaction by heating (that is, thermal curing). As discussed further infra, the secondary applied references, including Tachi, et al., which does not describe an episulfide compound, would have neither disclosed nor would have suggested the photocurable composition included in the coating composition of the present claims, including the episulfide compound and the photo-base generator.

In addition, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested such a coating composition as in the present claims, having features as discussed previously in connection with claim 1, and, moreover, wherein X^- of the structural formula (2) is selected from the group consisting of borate anion, an N,N-dimethylcarbamate anion, a thiocyanate anion and a cyanate anion (see claim 27), in particular, wherein X^- is a borate anion (see claim 3).

Furthermore, it is respectfully submitted that these references as applied by the Examiner would have neither taught nor would have suggested such coating composition as in the present claims, having features as discussed previously in connection with claim 1, and, in addition, wherein the photo-base generator is capable

of generating at least one of the specified compounds recited in claim 26, upon irradiation of ultraviolet rays; and/or wherein the photocurable composition of the coating composition has the property that it is cured by irradiation with light (see claim 28), in particular, by irradiation with ultraviolet light (see claim 29).

Moreover, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested such coating composition as in the present claims, having features as discussed previously in connection with claim 1, and, furthermore, having additional features as in the dependent claims reciting the coating composition, including (but not limited to) wherein Ar is further defined as in claim 2; and/or wherein in the general formula (4) the integers n and m are those set forth in claim 6; and/or wherein in the general formula (4) n is 0 (see claim 30); and/or wherein the coating composition further includes a solvent capable of dissolving the photo-base generator, as set forth in claim 7; and/or wherein the coating composition further includes (D) a silane coupling agent (see claim 11).

Furthermore, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested a method for curing the photocurable composition of the coating composition discussed previously in connection with claim 1 or 7, by irradiation of ultraviolet rays (see claims 8 and 16), or wherein the composition is cured by irradiation of ultraviolet rays in the absence of air (see claims 9 and 19).

Moreover, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested such cured product as in the present claims, as in claims 15, 17, 18, 20, 23 and 24.

In addition, even assuming, arguendo, that the teachings of the applied references would have established a prima facie case of obviousness, it is respectfully submitted that the evidence of record in the above-identified application, that is, especially the evidence in Examples 14-17 and Comparative Examples 6-8 on pages 31 and 32 of Applicants' specification, results being shown in Tables 3-1 and 3-2 on page 33 of Applicants' specification, shows unexpectedly better results achieved by the coating composition of the present claims, including (C) the modified silicone oil in amounts as in the present claims, establishing unobviousness of the presently claimed invention.

That is, it is respectfully submitted that this evidence shows unexpectedly better results in improved wetting property while achieving transparency, when including modified silicone oil in amounts as in the present claims, in the coating composition of the present claims. Thus, note that in Comparative Examples 6 and 7 no modified silicone oil or an amount of modified silicone oil less than that claimed in the present claims, is included in the composition, and wetting property was "C" (evaluation of wetting property being described on page 31, lines 24-28, of Applicants' specification). With amount of modified silicone oil greater than that claimed in the present claims, in Comparative Example 8, transparency was unsatisfactory (evaluation of transparency being described on page 32, lines 5-10, of Applicants' specification). In contrast, and as can be seen in Examples 14-17 with results in Table 3-2, wetting property and transparency were better including modified silicone oil in amounts as in the present claims.

As contended previously, this evidence in Applicants' specification must be considered in determining patentability; and, properly considered, it is respectfully submitted that this evidence establishes unobviousness of the presently claimed subject matter, rebutting any possible prima facie case of obviousness established by the teachings of the applied references.

As to the unexpectedly better results utilizing modified silicone oil, it is noted that the Examiner, on page 6 of the Office Action mailed April 27, 2009, points to Hojo, et al. as teaching a photocurable resin composition used in the field of optical articles, including modified silicone oil as a release agent with very high releasability. Such disclosure in Hojo, et al. provides no teaching with respect to transparency or wetting property of the substrate coated. In fact, disclosure of high releasability is directly contrary to high wetting property. It is respectfully submitted that such unexpectedly improved properties in transparency and wetting achieved by the present invention are clearly unexpected and are improved results in light of the teachings of the applied prior art, establishing unobviousness of the presently claimed subject matter.

In addition, it is respectfully submitted that the evidence in Applicants' specification shows unexpectedly better results achieved by the present invention, utilizing (i) the recited episulfide compound containing the thiirane ring and represented by the general formula (4), and (ii) the recited photo-base generator of the general formula (1), in achieving a photocurable composition, overcoming any possible prima facie case of obviousness established by the teachings of the applied references. Properly considered, it is respectfully submitted that this evidence shows unexpectedly better results achieved by the present invention, utilizing the photo-base generator

recited therein, as compared with using other generators, and clearly supports patentability of the presently claimed subject matter.

Thus, note that Comparative Examples 2-5, on pages 24-27 of Applicants' specification, utilize photo-acid generators. It is respectfully submitted that these Comparative Examples are closer than the closest prior art, i.e., the teachings of Amagai, et al. Note Table 1-2 on page 28 of Applicants' specification. As can be seen therein, the curing condition shows that upon curing examples within the scope of the present invention, no tackiness occurred (full curing occurred); while in curing the compositions in Comparative Examples 2-5, tackiness occurred (complete curing did not occur). It is respectfully submitted that this evidence in Applicants' specification shows unexpectedly better results (unexpectedly better curing) achieved by the present photocurable composition of the claimed coating composition.

On page 14 of the Office Action mailed April 27, 2009, the Examiner contends that Comparative Examples 2-5 cannot be the closest prior art because Amagai, et al. does not disclose photo-acid generators. Thus, the Examiner admits that Amagai, et al. does not disclose, nor would have suggested, photo-acid generators; based thereon, and even in light of the additional teachings of the other applied references including Tachi, et al., it is not seen how the Examiner can come to a conclusion of obviousness of the presently claimed subject matter, without Amagai, et al. disclosing any photo-acid generator. Of course, this is consistent with the teachings of Amagai, et al., which does not even disclose photocuring.

In any event, it is respectfully submitted that where the tested materials are closer than the closest prior art, then such tests must be considered substantively in

considering obviousness. As Amagai, et al. does not even disclose a photo-acid generator, as admitted by the Examiner, much less a photo-base generator, clearly inclusion of the photo-acid generators as in Comparative Examples 2-5 of the above-identified application constitute tests with materials closer than those described in Amagai, et al. Applicants again renew their contention that the evidence of record establishes unexpectedly better results as compared with the closest prior art, that is, Amagai, et al., the primary reference applied by the Examiner, as the Comparative Examples test materials closer than materials in the closest prior art.

The present invention is directed to coating compositions containing specified photocurable compositions, useful for producing various optical products such as optical adhesives, optical coating materials, optical fibers, filters and plastic lenses, among other products, methods of curing the photocurable compositions of such coating compositions, and the cured product formed therefrom.

Plastic materials have been recently used as various optical materials because of light weight, high tenacity and easy-dyeability. Various methods for photocuring episulfide compounds have been disclosed, as described in the paragraph bridging pages 1 and 2 of Applicants' specification.

Moreover, as will be discussed further infra, a photo-base generator which is a quaternary ammonium salt with N,N-dimethyldithiocarbamate has been described as a photo-base generator for photo-initiated thermal crosslinking of poly(glycidyl methacrylate).

Furthermore, episulfide compounds have previously been cast into a so-called mold and then polymerized and cured therein to obtain a cured product thereof.

Owing to the remarkably high refractive index of these episulfide compounds, there is a strong demand for applying the episulfide compounds as a coating material for various substrates. However, since coating materials made of the episulfide compound generally exhibit a poor wetting property to various substrates, it is difficult to stably form a thin film having a thickness of from several μm to several tens μm , of the episulfide compound.

Against this background, Applicants have solved the foregoing problems by the present invention. Specifically, according to one feature of the present invention, Applicants have found that by using a photo-base generator represented by the general formula (1) in claim 1, together with an episulfide compound containing a thiirane ring, represented by the general formula (4) in claim 1, a photocurable composition capable of being readily cured by irradiation of ultraviolet rays, and having a high refractive index, is achieved. Moreover, according to another feature of the present invention, a coating composition containing the photocurable composition and a modified silicone oil, in amounts as in claim 1, has improved wetting property together with transparency, with the photocurable composition thereof being capable of being readily cured by irradiation of ultraviolet rays, and having a high refractive index. See, e.g., the paragraph bridging pages 2 and 3 of Applicants' specification.

That is, Applicants have found that by adding a modified silicone oil to this photocurable composition including the specified episulfide compound and the specified photo-base generator, with amount of modified silicone oil as in the present claims, the composition is suitable as a coating composition since the composition shows a good

wetting property to various substrates. See page 4, lines 5-9, of Applicants' specification.

Moreover, Applicants have found that by further including a silane coupling agent in the coating composition, a coating film having excellent uniformity and adhesion property is achieved, as described in the paragraph bridging pages 19 and 20 of Applicants' specification. See claim 11

Applicants have, in particular, found that when the thiirane ring-containing compound is that set forth in formula (4), the resultant photocurable composition is preferred in terms of good surface hardness of the formed coating, easy handling and adequate viscosity. Note page 10, lines 3-13, of Applicants' specification.

Gobran, et al. discloses copolymers of episulfide compounds, which are prepared from one or more monomers which are free from ethylenic unsaturation and have a polymerizable thiiranyl group and one or more monomers having both a polymerizable thiiranyl group and a polymerizable ethylenically unsaturated group. See column 1, lines 44-48. Note also column 1, line 67, through column 2, line 9, disclosing initial polymerization products which are curable, essentially linear copolymers. This patent discloses that during polymerization by the process described therein, the episulfide rings of the monomers open up and the monomers polymerize through the open rings to form vulcanizable copolymers. Note column 2, lines 10-13. See also column 4, lines 10-13.

In connection with claims 15, 17 and 18, it is respectfully submitted that Gobran, et al. would have neither disclosed nor would have suggested such a cured product as in the present claims, formed utilizing, inter alia, the episulfide compound of formula (4),

much less use of the photo-base generator of Formula (1), with the cured product being formed from such episulfide and such photo-base generator. Furthermore, it is respectfully submitted that Gobran, et al. would have neither disclosed nor would have suggested the cured product formed from the composition including, in addition to the specific episulfide compound and specified photo-base generator, the modified silicone oil, particularly with amount thereof as in claim 1.

The contention by the Examiner in Item 5 on page 3 of the Office Action mailed April 27, 2009, that patentability of the product-by-process claims "is determined by the product itself", is noted. However, note that the product of the present claims includes units from the specified episulfide compound represented by the general formula (4) and the photo-base generator represented by the general formula (1) in claim 1. Clearly, Gobran, et al. would have neither disclosed nor would have suggested a cured product including repeating units from the episulfide compound and photo-base generator as in the present claims.

Sakane, et al. discloses a multi-layered dielectric film that is used as a coating film coated on the facets of semiconductor laser devices such as distributed feedback or distributed Bragg reflection semiconductor laser devices with gratings inside thereof. The multi-layered dielectric film is coated on the end surfaces or other surfaces of optical products and is composed of alternate layers consisting of two kinds of dielectric layer, one of which is a first dielectric layer of TiO₂ or ZnS with a high refractive index n₁ and the other of which is a second dielectric layer of Al₂O₃ with a low refractive index n₂. See column 1, lines 6-10 and 51-59. See also column 2, lines 32-40.

As can be appreciated from the foregoing, Sakane, et al. discloses layers of specific inorganic materials. It is respectfully submitted that the teachings of this patent would have neither disclosed nor would have suggested the cured product or coating film or optical product as in claims 20 and 23-25, including the product formed from the composition of the current claims, having, e.g., repeating units as would occur in the cured product formed from the composition of the composition claims in the application. Again, Applicants acknowledge that claims 20 and 23-25 involve product-by-process recitations, and that patentability is determined by the product itself. However, it is respectfully submitted that the product itself formed from the coating composition in the present claims, including from the episulfide compound represented by the general formula (4) and the photo-base generator represented by the general formula (1), particularly together with the modified silicone oil (C), would have neither been disclosed nor would have been suggested by the inorganic multi-layered dielectric film of Sakane, et al.

Amagai, et al. discloses alkyl sulfide type episulfide compounds which can be suitably used as an optical material, the episulfide compounds being represented by general formula (I) or (II) as set forth most generally in column 3, lines 1-16, of this patent. This patent discloses that an optical material is obtainable by polymerizing and curing the alkyl sulfide type episulfide compound represented by the general formula (I) or (II). Note column 3, lines 47-50. See also column 3, lines 54-63. This patent goes on to disclose that the described episulfide compounds can be polymerized/cured in the presence of a curing catalyst to prepare an optical material, any of the known curing catalysts for epoxy resins being used (see column 9, lines 51-57); and that the alkyl

sulfide type episulfide compound can be cured/polymerized with a compound having two or more functional groups which can react with an episulfide group, or a compound having one or more of these functional groups and one or more of other homopolymerizable functional groups (see column 12, lines 6-17). Various curing catalysts are disclosed from column 9, line 57, to column 12, line 3, of Amagai, et al.

Initially, it is noted that Amagai, et al. discloses, in general, an alkyl sulfide episulfide compound. It is respectfully submitted that this reference does not disclose, nor would have suggested, such coating composition as in the present claims, including the episulfide compound containing a thiirane ring and represented by the general formula (4), and the specified photo-base generator represented by the general formula (1), together with the modified silicone oil in amount thereof as in the present claims, and advantages thereof as a coating composition as discussed previously.

In addition, Amagai, et al. discloses polymerizing/curing of the episulfide compound; however, it is noted that, e.g., in Example 1 in columns 13 and 14 of this patent, the polymerization/curing was performed at a relatively high temperature of 80°C, i.e., thermal curing. It is respectfully submitted that Amagai, et al. has no disclosure of photocuring. It is respectfully submitted that this reference does not disclose, nor would have suggested, such photocurable composition as in the present claims, especially having the property that it is cured by irradiation with (ultraviolet) light, and including wherein a specified photo-base generator forms part of the composition, or the curing method, including wherein the curing is performed using ultraviolet radiation, or the cured product.

Note that Amagai, et al. discloses a great many specific examples of curing catalysts, from column 9, line 59, through column 12, line 3. These include quaternary ammonium salts of specific amines (previously disclosed in Amagai, et al.) and halogens, mineral acids, Lewis acids, organic acids, silicic acids, boron tetrafluoride and the like. Note column 11, lines 53-56. In view of the many catalysts described in Amagai, et al., it is respectfully submitted that this reference would have neither disclosed nor would have suggested, nor would have directed one of ordinary skill in the art to, specific photo-base generators, such as those described in Tachi, et al., discussed infra, even in light of the teachings of Tachi, et al.; nor would have provided any expectation as to the better results in curing properties achieved according to the present invention, by the photocurable composition of the present claims including the episulfide compound in combination with the photo-base generator, especially the photo-base generator represented by the general formula (1) as in the present claims.

Thus, and among other features of the present invention, it is respectfully submitted that Amagai, et al. would have neither taught nor would have suggested a coating composition including a photocurable composition as in the present claims, including the episulfide compound represented by the general formula (4), or method of curing including irradiation with light, in particular ultraviolet light, or wherein the photocurable composition has the property that it is cured by irradiation with (ultraviolet) light, and advantages due thereto; or even wherein the photocurable composition of the coating composition includes a photo-base generator represented by the general formula (1) together with the episulfide compound, as in the present claims.

It is respectfully submitted that the additional teachings of the secondary references as applied by the Examiner would not have rectified the deficiencies of Amagai, et al., such that the presently claimed invention as a whole would have been obviousness to one of ordinary skill in the art.

Tachi, et al. reports on photo products of quaternary ammonium dithiocarbamate and their application to photo-initiated thermal crosslinkers for poly(glycidyl methacrylate) (PGMA). Note, in particular, the first paragraph in the left-hand column on page 1330 of this article. The article describes a photo irradiation method in the left-hand column on page 1333. In summary, this article discloses that the quaternary ammonium salts with phenacyl groups and N,N-dimethyldithiocarbamate anions are good photo-base generators, for PGMA, that produce tertiary amines. Note the "SUMMARY" in the left-hand column on page 1341 of this article.

Initially, it is emphasized that the article discloses that quaternary ammonium salts with N,N-dimethyldithiocarbamate are photo-base generators for photo-initiated thermal crosslinking of poly(glycidyl methacrylate). This article does not disclose any effect of the crosslinking agent on optical properties, Tachi, et al. not disclosing optical properties at all. Noting that Amagai, et al. specifically discloses thermal curing, and that the article by Tachi, et al. does not mention at all an optical material, e.g., having high refractive index, or even episulfide compounds, much less episulfide compounds having a thirane ring, it is respectfully submitted that one of ordinary skill in the art concerned with in Amagai, et al. would not have looked to the teachings of Tachi, et al. In other words, it is respectfully submitted that these references are directed to non-analogous arts.

Moreover, it is respectfully submitted that the Examiner has pointed to no proper reason, based upon the teachings of the applied references to one of ordinary skill in the art, for applying the teachings of Tachi, et al. to the teachings of Amagai, et al.. In this regard, it is respectfully submitted that only through hindsight use of Applicants' invention, which of course is improper under the requirements of 35 USC 103, would one of ordinary skill in the art have applied the teachings of Tachi, et al. to Amagai, et al.

Furthermore, it is again emphasized that Tachi, et al. is directed to photo-initiated thermal crosslinking for poly(glycidyl methacrylate). It is respectfully submitted that episulfide compounds as in Amagai, et al. are quite different in properties than poly(glycidyl methacrylate). Thus, "S" is quite different from "C" in properties thereof, because they belong to different groups. Furthermore, the episulfide compound as in the present claims has a thiirane ring, whereas poly(glycidyl methacrylate) in Tachi, et al. does not have a thiirane ring. Particularly in view thereof, it is respectfully submitted that there would have been no reason for one of ordinary skill in the art concerned with in Amagai, et al. to have looked to the teachings of Tachi, et al., absent the description in Applicants' disclosure of their invention, which of course cannot provide a reason for combining teachings of references.

On page 5 of the Office Action mailed April 27, 2009, the Examiner recognizes that Amagai, et al. "[fails] to disclose that the photobase generators of formula (1) are used for the curing of the episulfide compounds", but notes that Tachi, et al. discloses a process of crosslinking poly(glycidyl methacrylate) and the use of quaternary ammonium salts of formula (I) as photo-base generators. The Examiner goes on to

state on pages 5 and 6 of the Office Action mailed April 27, 2009, that it would have been obvious to use the quaternary ammonium salts disclosed Tachi, et al. as curing catalyst/photo-base generators for the episulfide compounds with thiirane rings of Amagai, et al., "based on Amagai's teachings that any curing catalyst used for curing epoxy resins can be used to cure the episulfide compounds", the Examiner pointing to column 9, lines 54-56 of Amagai, et al.

However, as mentioned previously, the episulfide compound is quite different from the poly(glycidyl methacrylate) in Tachi, et al., from a view point of chemical structure; and, moreover, Tachi, et al. does not discuss optical materials, much less optical materials having high refractive index. It is respectfully submitted that one of ordinary skill in the art, e.g., in connection with optical materials and compositions for producing such materials, even with the teachings of Amagai, et al. and Tachi, et al. in front of him, would not have looked to application of Tachi, et al. to episulfide compounds having a thiirane ring, even in light of the disclosure at column 9, lines 54-56, of Amagai, et al.

Particularly in view of the unexpectedly better results achieved according to the present invention, utilizing the composition (that is, combination of components) as in the present claims, any conclusion of a prima facie case of obviousness of the photocurable composition of the coating composition of the present claims, established by combining the teachings of Amagai, et al. and Tachi, et al., is overcome.

It is again emphasized that Amagai, et al. has no disclosure, or any mention, of photocuring, in connection with curing the described episulfide compounds, Amagai, et al. having thermal curing. In contrast, Tachi, et al. discloses quaternary ammonium

salts with dithiocarbamate anions acting as photoinitiated thermal crosslinkers for poly(glycidyl methacrylate) films. It is respectfully submitted that absent Applicants' disclosure, there would have been no reason to combine the teachings of Amagai, et al., which do not even mention photocuring at all, with the teachings of Tachi, et al., describing specific quaternary ammonium salts acting as photoinitiators.

Moreover, as a person of ordinary skill in the art in connection with Amagai, et al., would never have been motivated to combine the teachings thereof with the teachings of Tachi, et al., it is respectfully submitted that such person would never have considered using the quaternary ammonium salts mentioned in Tachi, et al., in compositions of Amagai, et al., from the quaternary ammonium salts disclosed in Amagai, et al.

Furthermore, the unexpectedly better results achieved according to the present invention are again noted. Even combining the teachings of Amagai, et al. and Tachi, et al. as applied by the Examiner, it is respectfully submitted that one of ordinary skill in the art would never expect the excellent curing properties obtained through use of the composition having the photo-base generator represented by the general formula (1) as in the present claims, together with the episulfide compound containing a thiirane ring and represented by the general formula (4), as in the present claims.

It is respectfully submitted that the teachings of the additional secondary references applied by the Examiner, that is, Hojo, et al. and Haniu, et al., would not have rectified the deficiencies of the teachings of Amagai, et al. and Tachi, et al., such that the presently claimed invention as a whole would have been obvious to one of ordinary skill in the art.

Hojo, et al. discloses photocurable resin compositions suitable for formation of a finely embossed surface structure on an optical article, wherein in a first aspect the composition includes, as essential components, (A) a binder resin having photopolymerizable functional groups and (B) inorganic superfine particles in the order of sub-micron which can be dispersed in a colloidal form in a diluting solvent for preparation of a coating liquid. See paragraph [0031] on page 3 of Hojo, et al. Note also paragraphs [0032] and [0037] on page 3 of this document. This patent document also discloses that a release agent may be blended with the photocurable resin composition, and that by blending the release agent with the photocurable resin composition a partial remain of the photocurable resin in a press stamper pressed against the resin can be prevented when the press stamper is removed (see paragraph [0148] on page 12); and that a silicone-type release agent is particularly preferable, the silicone-type release agent including polysiloxane, modified silicone oil, trimethyl siloxy silicic acid-containing polysiloxane, silicone-type acrylic resin, etc. (see paragraph [0150] on page 12 of this patent document). Moreover, Hojo, et al. discloses that an organometallic coupling agent may be incorporated into the photocurable resin composition in order to improve heat resistance and strength of the surface structure having a finely embossed pattern, or adhesion thereof to a metal-deposited layer. See paragraph [0163] on page 13 of Hojo, et al.

Haniu, et al. discloses an electronic component material containing pest repellent effective for repelling pest insects in electronic appliances used in professional kitchens and the food industry, which comprises a resin which can be crosslinked and cured, a pest repellent contained in the resin, and a filler contained in the resin, in which a pest

repelling layer is formed by curing the resin by crosslinking chemical reaction. Note paragraphs [0001] and [0007] on page 1 of this patent document. Note also paragraphs [0008]-[0010] and [0014] on page 1; and paragraph [0041] on page 2, of this patent document.

Initially, it is noted that Haniu, et al. is directed to printed wiring boards and other electronic components "having excellent cockroach repelling performance". It is respectfully submitted that one of ordinary skill in the art concerned with in, e.g., Amagai, et al., directed to episulfide compounds suitable for optical materials, would not have looked to the teachings of Haniu, et al. That is, in view of different technologies involved in these two references, and different problems addressed by each (Haniu, et al. being concerned with providing a cockroach repellent layer), one of ordinary skill in the art concerned with in Amagai, et al. would not have looked to the teachings of Haniu, et al. In other words, these references are directed to non-analogous arts.

Again noting differences in the uses of materials of Amagai, et al., on the one hand, and Haniu, et al., on the other, it is respectfully submitted that there would have been no reason for combining the teachings of these references, absent hindsight use of Applicants' disclosure. Of course, such hindsight use is improper under the requirements of 35 USC 103.

In any event, even were the teachings of these references as applied by the Examiner (that is, Amagai, et al., Tachi, et al., Hojo, et al. and Haniu, et al.) properly combinable, it is emphasized that Haniu, et al., as applied by the Examiner, discloses epoxycrylates such as glycidylmethacrylate cured by crosslinking. It is respectfully submitted that glycidylmethacrylate, which has a glycidyl (epoxy) group and

methacryloyl group, is quite different from the compound represented by the general formula (4) in present claim 1. That is, it is respectfully submitted that the compound represented by the general formula (4) in present claim 1 has two β -epithio groups, and does not have a methacryloyl group. It is respectfully submitted that in view of the vastly different compound in Haniu, et al. and of the compound represented by general formula (4) in claim 1, one of ordinary skill in the art would never have compared the epoxy acrylates as in Haniu, et al., with the compounds of the general formula (4), with respect to processing thereof.

Furthermore, the contention by the Examiner in the last paragraph on page 6 of the Office Action mailed April 27, 2009, of including the modified silicone oil "as release agent" as disclosed by Hojo, et al., "in the modified composition of modified Amagai et al., in order to take advantage of the high releaseability properties of the modified silicone oil", is noted. However, it is also noted that according to the present invention, the modified silicone oil is used for improvement of adhesion property, which is a property opposite to releasability as relied upon by the Examiner. It is respectfully submitted that the teachings of the references as applied by the Examiner, including Hojo, et al., would have neither disclosed nor would have suggested incorporating the modified silicone oil in compositions of the present invention, in amounts thereof as set forth in the present claims, achieving an adhesion property as in the present invention. It is respectfully submitted that particularly in light of high releasability as referred to by the Examiner, in connection with the teachings of Hojo, et al., the improved adhesion property achieved according to the present invention constitutes an unexpectedly better

result for the presently claimed subject matter, providing a further basis for a conclusion of patentability over the teachings of the applied references.

In this regard, the contention by the Examiner in the paragraph bridging pages 17 and 18 of the Office Action mailed April 27, 2009, that Hojo, et al. "was only relied upon to show that modified silicone oil is known in the art of optical materials as release agent", is noted. However, it is again emphasized that according to the present invention the modified silicone oil provides improved adhesion, opposite to a "release agent". Emphasizing that the present claims recite, inter alia, a coating composition, with the modified silicone oil providing improved adhesion of the cured coating formed from such coating composition, it is respectfully submitted that reliance by the Examiner on Hojo, et al. as showing modified silicone oil to be used as a release agent would have taught away from the presently claimed subject matter.

In view of the foregoing comments and amendments, reconsideration and allowance of all claims presently in the above-identified application are respectfully requested.

To the extent necessary, Applicants hereby petition for an extension of time under 37 CFR 1.136. Kindly charge any shortage of fees due in connection with the filing of this paper, including any extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Account No. 01-2135 (case 396.45781X00), and please credit any overpayments to such Deposit Account.

Respectfully submitted,

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